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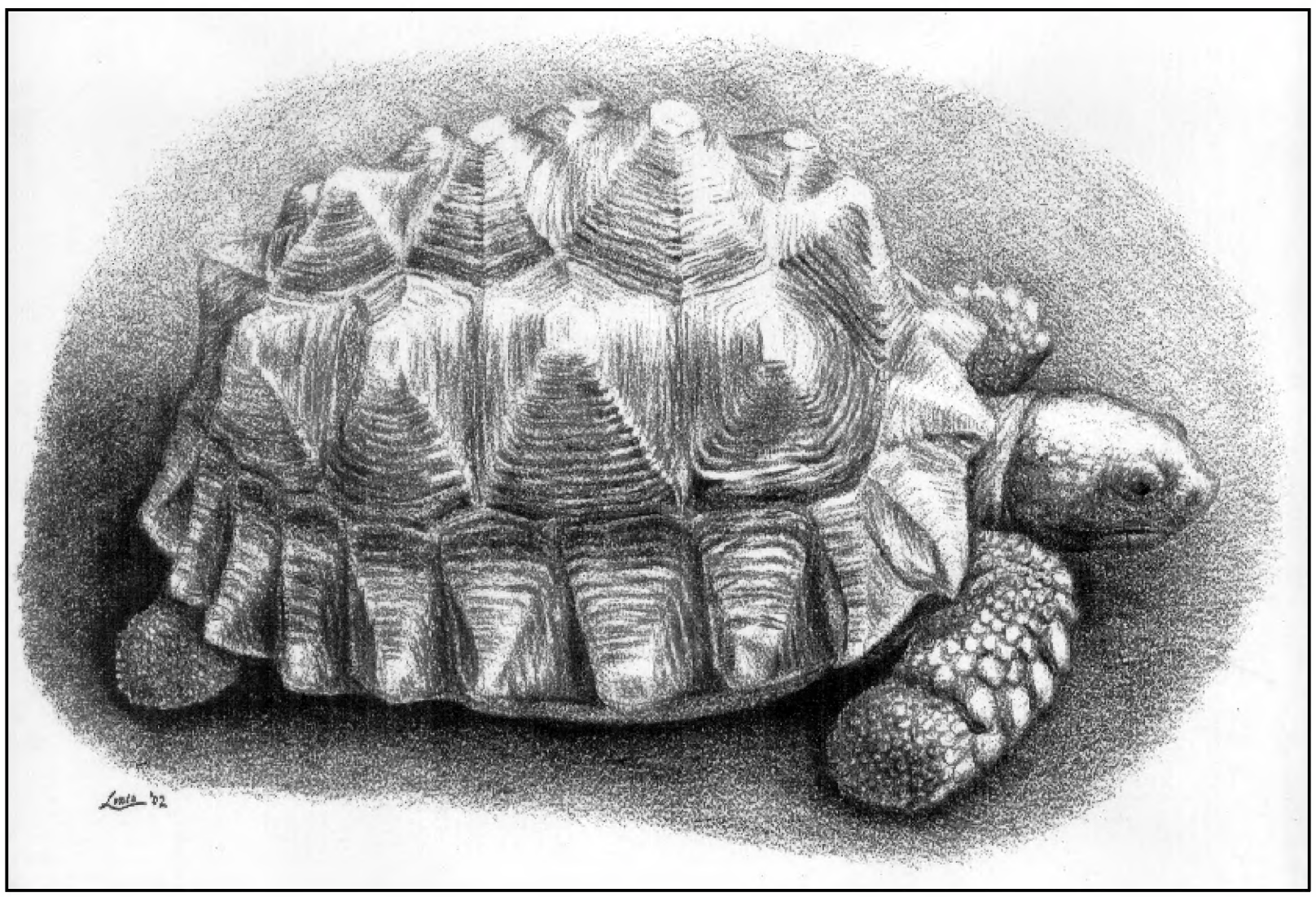

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Dialogues on the Tao* of *Lachesis*

* Tao: "the way" in literal translation. Taoism is an ancient Chinese school of thought that advocates open mind to all possibilities, in the same way that "the uncarved block" presents itself to the sculptor.

Earl Turner [1], Rob Carmichael [2] and Rodrigo Souza [3]

Introduction

Deep in the Atlantic rainforest in Brazil, at the Serra Grande Center (SG), a series of chicken wire, outdoor enclosures with various natural vegetation, artificial burrows/retreats and exposure to the natural elements has provided Dr. Rodrigo Souza with the opportunity to successfully raise and breed *Lachesis muta rhombeata*. Although seemingly "primitive" (from now on PH, for Primitive Herpetoculture) by today's highly technological standards of captive care, it behooves us to consider looking outside the box in terms of proper captive care of sensitive species like *Lachesis*.

The three authors come from very different backgrounds with respect to geography, husbandry philosophy, and facilities. Looking at the ways of Taoism, however, despite our very different backgrounds, we have been able to achieve success in working with *Lachesis*. It is our intention to not only show some of our methods in working with bushmasters, but to also provide a template for working with other species and incorporating field studies and observations with captive care.

Rob Carmichael serves as Curator of the Wildlife Discovery Center (WDC) in Lake Forest, Illinois, where the bushmaster is displayed in a semi-naturalistic exhibit utilizing both modern-day herpetoculture methods and the integration of observations made from the more "primitive" way.

Dr. Earl Turner comes from a zoo background in the Texas area where he has kept and bred various *Lachesis* by utilizing modern day advances in technology under controlled, indoor conditions (Turner, 1997, 1998).

So what method is best? The (apparently) "primitive," au naturale (but not naive) way, or utilizing today's technology to re-create natural conditions in a controlled, indoor setting? BOTH! We will be sharing our experiences, our failures, our passion and our sincere desire to share everything we consider relevant to help others avoid the many problems we've faced while dealing with the *Lachesis* clan, with special emphasis on *Lachesis muta rhombeata*, *L. m. muta* and *L. stenophrys*.

The maintaining of the subspecific status in this paper is not a personal stand for or against anyone. It means in Rod's case that he is specifically referring to *Lachesis* from the Atlantic rainforest, from the Brazilian east (Atlantic) coast. It's necessary however to remember that many authorities are not very enthusiastic about subspecies in herpetology, because often it seems that they were established based on superficial attention to one or a very few characteristics—and at least sometimes, if we look at another character we would establish different subspecies. For *Lachesis*, so far the clearly demarcated taxa, which we call species, are *L. acrochorda*, *L. melanocephala*, *L. muta* and *L. stenophrys*. Subdividing *L. muta* into *L. m. muta* and *L. m. rhombeata* is in taxonomic limbo and under major controversy (Ripa, 2000–2006; Fernandes et al., 2004). The present edition of the *International Code of Zoological Nomenclature* (Fourth Edition, ISBN 053301-006-4), however, does maintain trinominal nomenclature (subspecies).

The feeding challenge

Whoever wishes to be successful in maintaining these pit-vipers in captivity must begin by understanding the unique feeding habits and the natural eco-biology involved. Well fed, healthy, stress-free animals are step one towards longevity and any reproductive attempts.

One of the inhabitants of the remaining 7% of the original Atlantic rainforest, a little brown rice rat (*Oryzomys* sp.), known locally as the "paca" mouse, is a bushmaster's favorite in the wild. The average weight of these wild rodents and of four other rodent species that Rod has captured in prime *Lachesis* territory is around 90 g (~3 oz) or less. That makes us think that in nature *Lachesis* is very active (at night) and is constantly moving around searching for "light" meals (90 g), and most likely feeds more than once a week. The fit and strong individuals we've all met in the wild are the living proof of it. Heavier prey items are offered to them in shady Serra Grande—every eight days if it's "cold" (20–24°C / 68–75.2°F), or every fifteen days if its sunny (24–28°C / 75.2–82.4°F). Bushmasters are extremely selective when it comes to feeding, and unlike in the sympatric *Bothrops* genus, even animals in the 2.4 m (~8 ft) total length (TL) range will not usually try to strike-hold any prey weighing over 220 g (~8 oz). As a comparison so that we may comprehend how specialized these animals are, a large Brazilian *Bothrops* like *B. jararacussu* (1.8 m or ~6 ft TL) can easily ingest a 400 g (~14 oz) rat or guinea pig.

One of the wonderful benefits of today's internet is the ability to network and converse with other professionals. After a brief discussion via email with the other two authors, the keepers at WDC realized that they were offering prey too large for a *Lachesis muta* that had just arrived at their facility. After many unsuccessful offerings, they decided to offer an adult mouse to the 5-ft male *L. muta*. Needless to say, they had a happy ending.

Bushmasters will strike-hold in the shoulder area any living prey (mostly mammals, occasionally birds) weighing up to 120 g (~4 oz), basically what the snake will find in nature, and will

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usually strike-release and conduct chemosensory search and trail-following (a hard and frequently unsuccessful task in the flooded rainforest) if the prey weighs over 120 g. Large prey reaction to strike-hold could be dangerous to the snake: 220 g (~8 oz) is the heaviest prey item we suggest one should offer to adult individuals. Ideal prey size in Serra Grande was learned the hard way, through mistakes that have resulted in regurgitation and esophagus injury, that sometimes led to death. Once again, we can take some of these in situ and field observations and translate them into our own captive management programs in dealing with *Lachesis*. By taking note of the mistakes made in the past, we can make improvements in order to prevent future problems, that usually start with the offering of oversized rats, in a hot enclosure (more than 28°C or 82.4°F). Knowledge is power, and this knowledge about bushmasters' feeding preferences in the Atlantic rainforest was achieved by interviewing native people (mostly hunters and woodsmen), and by placing mousetraps in different crops. This was the starting point of Nucleo Serra Grande 7 years ago, when we started efforts to control the slaughter perpetrated against these snakes (by safely removing individuals found in roads, crops or residential areas), labeled as "Vulnerable" by the International Union for the Conservation of Nature.

The picture below shows the true bushmaster strike-hold approach, always in the shoulder area, with venom injected directly in heart and lungs, causing "instant" death. These observations, strike-hold or trail following (chemosensory search) according to size of the prey, confirm those of Chiszar et al. (1989) and Boyer et al. (1995).

A very special need

A cool temperature by tropical standards of 16.6°C (61.8°F) has been recorded in Serra Grande, which is in prime natural *Lachesis* territory, within the Atlantic rainforest, 150 m above sea level, with humidity levels always around 85–99%. In the fake armadillo burrows offered to the snakes, the temperature has reached 14°C (57.2°F); it is reasonable to affirm that the averages within the well preserved rainforest are around 21–25°C (69.8–77°F) all year long. Thus, temperature is a critical component of proper *Lachesis* care and we recommend a thermal gradient to allow these snakes to cool down as needed.

True strike-hold: fangs in the heart and lungs + lifting prey above the ground.

The length that these snakes may reach is a very controversial issue. They are the largest venomous snakes of the Americas (second in the world only to king cobras). Bushmasters beyond 300 cm TL are rare, and Ditmars' (1910) *L. stenophrys* at 350–360 cm TL remains as the longest specimen.

In 1957 a DC-3/C-47 delivered a large box flown from Colombia to the U.S. by the Tarpon Zoo of Tarpon Springs, Florida. When it was opened, all that could be heard were words of astonishment by Fred Penman, Trudie Jerkins and Dr. Earl Turner, as out crawled the biggest bushmaster they all have seen to this day. Immediately a string was laid as closely as possible next to this snake. After the operation was completed a few times, the string measurement was 12 ft, 1 in. Allowing for several factors, they all agreed that the snake was (at least) 11 ft, 3 in, give or take an inch. At approximately 342.9 cm TL, this snake is probably among the three longest bushmasters ever (reliably) measured.

So, with such a huge digestive tube and the low temperatures (and low metabolism rates) of the natural habitat, small prey preference may be taken as an evolutionary adaptation (Ripa, 2000–2006) to cold environment (slow digestion). Oversized food items could turn into putrid gas bombs inside the animal, halfway into the intestine (incomplete digestion), often killing the snake if it's too late for vomiting it. The proteolytic action of the *Lachesis* venom is not remarkably strong and it does not help digestion as much as *Bothrops* venom does, for instance. For this reason, bushmasters are never seen basking in the sun after eating, thus accelerating general metabolism, something that *Bothrops* always does. If the average temperature in the enclosure is above 28°C (82.4°F), keepers will probably experience a high rate of regurgitation and its hazards to the health of the animals. Captive observations indicate the same behavior as our *Lachesis muta* and *L. stenophrys* exhibit tendencies towards the cooler end of their exhibits even after feeding, although they will bask under a low level heat source on occasion.

Notes on husbandry

The (PH) offering of live prey in Serra Grande means to Rod that snakes will have to exercise through the obstacles of the outdoor enclosures, and preserve hunting skills and tactics, and that will apparently contribute to better overall health. Obesity is a well known problem for the captive. Sometimes specimens of some collections are so lethargic even at nighttime that they seem "depressed." The prey offered consists of 2-month-old Wistar rats, born and raised in Serra Grande with the best rodent food available, deparasitized with ivermectin every 6 months, drinking from the pure water collected from the daily thunderstorms, and supplemented with extra doses of vitamins. It's well known however, that after 90 days frozen, thawed frozen prey items will not be a vehicle for any parasites, and that's a priceless peace of mind for keepers.

We have never seen a serious injury inflicted by live rodents offered to the snakes in Serra Grande. One snake was stabbed in the eye when the two of them strike-held a single mouse at the same time: keeper error. At Serra Grande we are talking about 40 m^2 enclosures, for 4–5 individuals maximum loaded with places for the rodents to hide. For public exhibits at the WDC,

Results of bushmaster necropsies. The image on the left shows healthy looking pulmonary tissue, and a normal looking heart. The righthand image shows a heavily parasitized lung, with an abnormal amount of fluid. These are pentastomid parasites (*Porocephalus* sp.) (see Gárate et al., 2007); some are almost 2 in long when adults. They are found in wild caught animals. The pulmonary cycle of these worms will make the snake stay uncoiled, eventually with an abnormally open mouth. Routine deparasitization is essential to keep things under control: the parasite load must not be too high when you treat the snake. If hundreds of large individuals like these *Porocephalus* die inside the lung during treatment, their decaying will induce a fatal pneumonitis, which is a "foreign body" type of inflammatory reaction to the fluids created in the decomposing process, and that will lead to poor oxygenation and pneumonia due to bacterial attack in an already weakened snake. It must be said however, that it is not clear at this point if any anthelmintic drug is effective against hematophagous pentastomids once they get installed in the lung. Ivermectin may be helpful, and so is endoscopic removal of individuals, dead or alive.

we typically keep one bushmaster per enclosure. In a con trolled, indoor setting, the practice of feeding frozen thawed prey works well but it is critically important to use long tongs to introduce prey. An errant feeding strike can be catastrophic if you are in the line of attack. Always offer food at an angle to help prevent an accident. Sometimes snakes will just eat dead mice offered to them without injecting venom (and helping digestion substantially), and that's also to be avoided for complete absorption of the nutrients. If you go MH, be sure to set the microwave for the correct strike-inducing temperature: prey offered should have a body temperature of around 95°F (35°C).

Practitioners of MH often condemn PH for (1) keeping colonies in (2) open serpentariums, mostly because of the difficulties with parasite control, administering medication, and keeping track of feeding frequency on an individual basis. Another concern is an eventual loss of sex drive in communally kept animals. And all these are genuine worries for keepers worldwide.

MH considers individual enclosures where snakes lie on newspapers as the ideal way to achieve longevity records. The rationale behind it is a sense of total control. Dr. Turner and Rob Carmichael keep off-display bushmasters on newspaper and Dr. Turner has achieved breeding success taking this simple approach towards their care. Rod is not a critic of the method at all: fungus free, easy to clean, keeping excessive moisture away from the animals. In Serra Grande babies lie on newspapers for their entire first year, although space is an issue for the well being of large animals like *Lachesis*.

Serra Grande seems to have learned from both MH and PH over the years, and in the daily routine the best of each is put into practice. Vivaria of up to 40 m^2 for a colony of 2 males and 3 females amidst the Atlantic rainforest mean ethical confinement to Rod. In such spacious areas, not overexposing individuals to each other, libido is not affected. Such vivaria where animals actually exercise, hunt, bathe in the rain and bask in the early morning sun, would be inappropriate without the possibility of parasite control (MH). The communally kept animals will go to an intensive care unit at least once a year, during the rainy season (April–May) for a routine prophylactic isolation. Probing, deworming, nutritional supplementation and overall evaluation takes place in the ICU, where the snakes remain isolated in individual 2 × 1 m nylon camping tents. Meanwhile the floor of the original vivarium where the colony is kept is being replaced and actually carbonized with "blue flame" torches in an attempt to control eventual larvae and organic waste that would cause transdermal infection (*Strongyloides* spp., *Rhabdias* spp., etc). Native ants are taken as the greatest helpers (scavengers) in the daily, constant and never-ending clean-up task. Since there are only screens between snakes and forest, those little and welcome friends are always in and out of the vivaria at night. It took a long time to understand their importance and turn walls into screens especially to permit this "cooperation." Ticks, mostly of the genus *Amblyoma*, around Serra Grande are also under control (at this moment) partly because of the ants. But yes, the highly effective fipronil spray is used every once in a while: one-minute operation, spray and let go. Fecal samples have revealed that so far Serra Grande is on the right track as far as parasite control is concerned. PH can be a true headache and virtually an impossible task, specially in outdoor enclosures if parasite control is neglected.

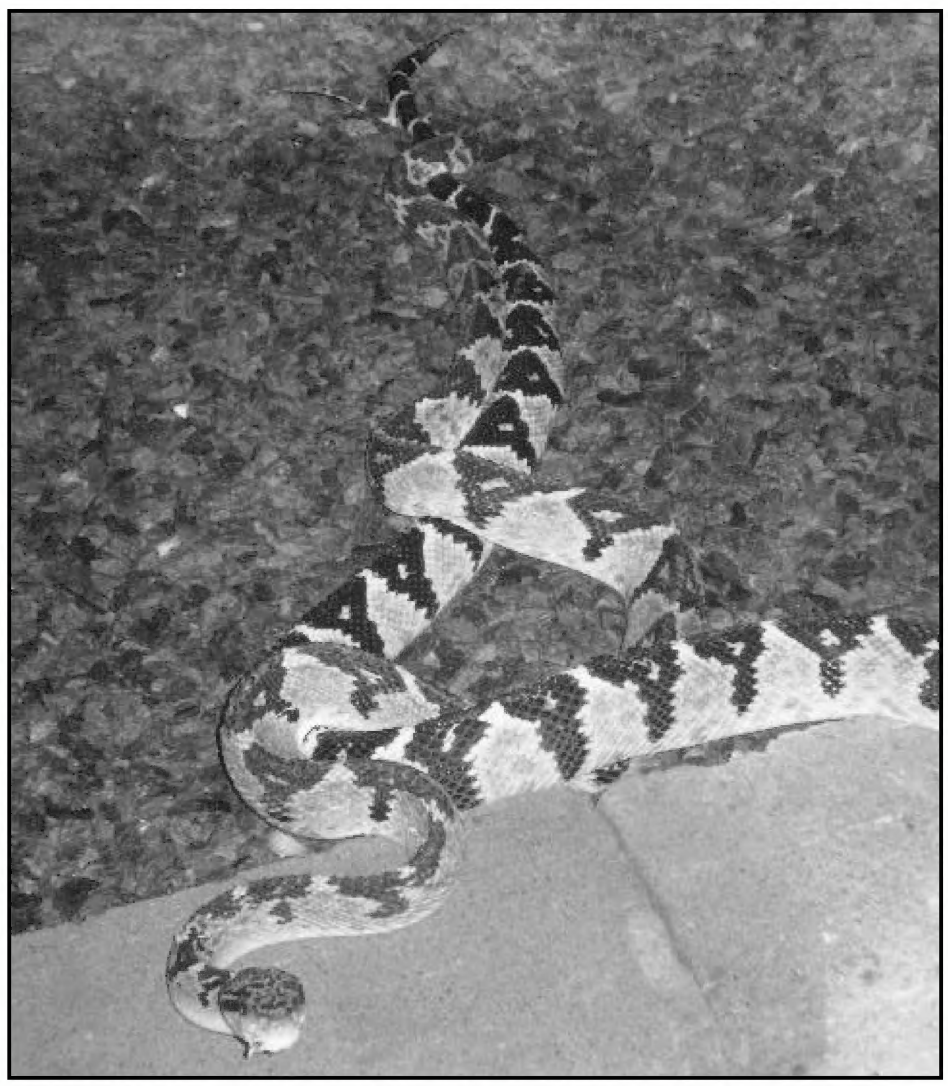
If individual enclosures (MH) are the choice because "it's more in line with the natural behavior of *Lachesis*," it has to be questioned if anyone one has enough field observation time to affirm that. The animal is getting to be so rare in a vast and sometimes inaccessible rainforest territory, that its more accurate to admit not enough data to evaluate the matter. In the case of Serra Grande we are talking about an 8 × 5 m enclosure (exten-

sive method) loaded with Atlantic rainforest vegetation and places to hide, a 2.2 colony will still pile up in one single spot, regardless of ten other "hot spots" available in the same area, under the same conditions of temperature and humidity. And that happens during all seasons. In these vast artificial set-ups, however, the potential for harm to the snake or the keeper is greater, but these were where for the first time in Brazil, sexual activity for the genus has been consistently recorded.

Alternation (routinely and on demand) of three husbandry methods (extensive/outdoor, semi-extensive/indoor room, and intensive/nylon tent) according to time of the year and individual conditions follows from the same reasoning that is behind WDC's off-display efforts: these creatures are too precious to afford a single loss.

Obviously, if you take this information and apply it to a zoological institution like the Wildlife Discovery Center, it would be impractical to dedicate an entire building for a public display of bushmasters (although that would be very cool and having a large Atlantic rainforest habitat featuring a group of *L. m. rhombeata* would be visionary!). The WDC has space limitations but always puts the needs of the animals first and foremost. In 2006 the WDC contracted Habitat Systems, Ltd. to construct an exhibit measuring 10 ft wide × 3 ft deep × 4 ft high. This exhibit holds one large female *Lachesis m. muta*, and features real tree limbs and hollows to provide secure hiding areas. The substrate consists of a deep layer of peat, soil, leaf mulch, cypress mulch, sand (very little) and forest humus. A layer of dead leaves is sprinkled over the surface to allow the snake to nestle in, provide security and allow for natural ambush behavior (particularly when resting against a large dead tree limb). A large water pan is always kept filled with fresh water.

Upon advice from Dr. Turner, it was decided to keep the substrate fairly dry in WDC, but maintain moderate to high ambient humidity levels. Captive *Lachesis* oftentimes succumb to an illness commonly referred to as "red belly disease," a deadly fungal and bacterial dermatitis. Upon microscopic examination on pieces of infected scales, the snakes actually develop a type of septicemia (blood poisoning). It can be credited as mismanagement of the snake. It occurs when a bushmaster is kept too moist. Any cypress mulch or other substrate should be totally dry if utilized for *Lachesis*. Many medications have been used—to no avail. Dr. Turner has utilized the drug Naxcel which should be given either subcutaneously or in the lateral muscle. A total of 10 injections should be given: 1 per day alternating in the lateral muscle. This treatment is credited with saving two *Lachesis stenophrys* that were received by Dr. Turner in extremely poor condition. Both snakes regained their health after receiving the treatment using Naxcel. The dosage for Naxcel is .25 cc per 10 lbs of body weight.



The first known image of an actual mating of Atlantic bushmasters, taken in the semi-extensive indoor system at Serra Grande in 2007.

Naxcel comes in 1 g bottles and the shelf life after being opened is very short. So after the treatment is concluded freeze the remainder and it will retain its potency. This will save bushmasters from a fatal disease caused by stress and a cage substrate which is too moist. So how could "Primitive Herpetoculture" deal with the "red belly" issue, in outdoor enclosures? Here again the three authors are in an agreement, for in the outdoor vivaria in Serra Grande there is a rocky bottom that prevents snakes from direct contact with the muddy forest ground, and these enclosures are placed on slopes so as to achieve natural drainage of water. Also there can be no better ventilation than in those chicken wire enclosures. The animals are truly stress free, and the proof of it is the absence of scraped snouts: they don't seem to realize that they are confined and are not looking for escape routes, and besides, none is being force fed.

A snake continually sitting on a moist surface in a captive setting can develop all kinds of problems. So, we will heavily mist the cage every 2–3 days and allow it to dry slowly. We use hand held misters rather than expensive and elaborate misting systems, so that the snakes get used to daily interaction with keepers. Stress management is the most critical component of successful public exhibition of *Lachesis* (assuming that the environment is appropriate). A happy bushmaster lies in a coiled position except when foraging for prey. At night, they begin to forage and become very alert—do NOT attempt to muck with bushmasters at night! Any signs of stress related myopathy results in the animal being taken off exhibit right away—our bushmasters are much too precious to take any chances. The WDC exhibit utilizes Pro Product Radiant Heat Panels attached to thermostat to provide both a basking area as well as proper ambient temperatures including a slight night drop. The three authors agree with the offering of a drier substrate to the snakes. Even in outdoor enclosures in Serra Grande a layer of rocks is above the natural jungle soil, to aid in fungus and parasite control.

Notes on Reproduction

Serra Grande listened to folk knowledge and common sense, as well as paying attention to science and previous experiences

while testing what is today the only successful breeding center for *Lachesis* in Brasil. The process led to questions as why should money be spent in egg incubators if the Atlantic rainforest has been doing it (incubating eggs) for maybe 300–800 thousand years (disjunction Amazon-Atlantic rainforests, according to Zamudio and Greene, 1997). This is a true MH vs PH argument that has happened in the past. In Serra Grande the eggs were kept in the forest under major protection, but exposed to natural the temperatures and humidity. In the end, at an average temperature of 25 °C / 77 °F (very cool by tropical standards), the success ratio in 2007 in Serra Grande would have been 100% if a small fly attack didn't induce the loss of 2 out of 16 eggs, from two different pairings (Souza, 2007).

In Atlantic rainforest of the Brazilian east coast, among wild caught animals, females are much more common than males. A 1 (male): 5 (female) ratio is not a very wild guess. If the continual destruction of habitat (93%) for the last 500 years (and global warming) has brought historical series of higher temperatures to the remaining forest surroundings it is hard to affirm, but one thing seems to occur under controlled conditions: the higher the temperature, the majority of neonates are female, correspondingly, the lower the incubation temperature, the majority of hatchlings are male, and that seems to point towards the possibility that temperature actually influences gender in this genus.

Somma (2003) confirms what all those who breed bushmasters know by experience: there is parental care among reptiles towards eggs for sure, and eventually towards neonates. We cannot at this point confirm even any short term care for neonates in bushmasters, in Serra Grande the one attempt to leave the eggs with the female ended up with the total loss of fourteen eggs (insect attack). A special enclosure is being designed the get safely back to the experiment, and maybe find out something beyond the well known brooding behavior such as effective neonate care. The functions of brooding in thermo- and hydroregulation are often overshadowed by the defensive function. If there is one occasion to be extra careful while around bushmasters, it is egg removal. All native people in the Atlantic rainforest have stories to tell about "attacks" from male and female that were protecting the nest. Three times in Serra Grande, male and female bushmasters were found (and photographed) guarding the eggs, a behavior yet to be confirmed by further observation, and not observed other than in *rhombeata*.

The natural arrival of a series of cold fronts in the Atlantic rainforest takes place early in the second half of the year, and the combination of sudden temperature drops and rise in humidity levels is what triggers the sexual behavior: males with unusually high tongue-flick rates indicate the beginning of new mating opportunities. And this will project egg laying during the dry season, when flooding is less likely to occur. So this is another key issue for the breeding of bushmasters under controlled situations: the possibility of simulating a cold front in the enclosure, with a sudden temperature drop and rise in humidity. Notice that the words "breeding season" have been intentionally avoided. Animals of very different ages can be found in a 12-month span in the Atlantic rainforest, and maybe as Mother Nature's response to population decline, there might be various fertile periods (and not one breeding season) in the bushmaster's biological clock. "Off season" mating has been photographed. Cold fronts generated in the Antarctic may hit Brazil all year long, and maybe these "barometric opportunities" are not being taken for granted anymore.

The perfect formula to *not* achieve bushmaster reproduction in captivity is: unfit (too young, too old, suffering from malnutrition or stressed) animals + very little space + too much disturbance. The vigorous male combat observed may trigger some hormonal responses needed for sexual activity, and this alone calls for a spacious area for the group. Real "wart skin" (teens are smoother) individuals, in the 6 ft (1.80 m) TL range and around 8 lbs (4 kg) of weight (minimum) are the natural candidates, those we can call "adults." One of our greatest references, Boyer from Dallas Zoo, went from water to wine after moving his animals from 0.75 × 2.25 × 0.5 m high boxes to a 3.6 × 2.3 × 2.4 m high room. In Serra Grande the semi-extensive method consists of large rooms, 6 × 4 m, not exposed to weather (cement walls and roof) but within the Atlantic rainforest and the natural parameters of temperature and humidity of *Lachesis* territory. This is nothing new and was inspired by the big adapted fridge of the Dallas Zoo, and their most successful and pioneer breeding program—*Lachesis* needs space.

Avoiding neck injury

Boyer et al. (1989) begin their groundbreaking paper with the following sentence: "The longevity record of the Bushmaster *Lachesis muta* in captivity has been unimpressive; its large size and apparently calm disposition belie its delicate constitution." The cornerstone of the handling of these animals is to avoid any contact with the fragile neck region. It's just too much muscle for a not so strong osteo-tendinous frame, and if not properly immobilized, the animal will twist in its own axis, provoking self-inflicted irreversible medullary damage and death.

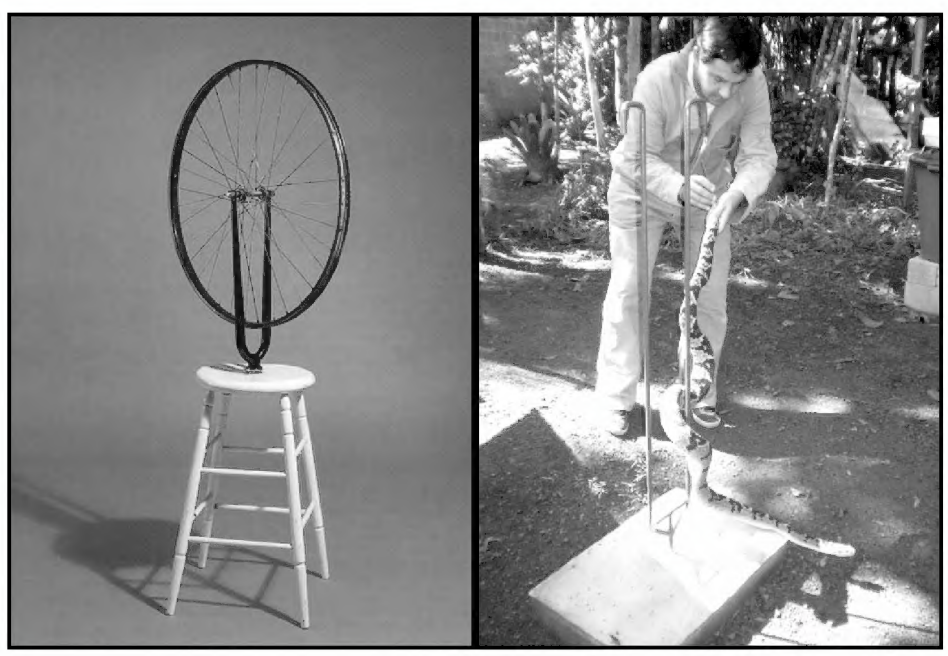
It is unrealistic however to assume that *Lachesis* will never have to be restrained in the traditional way. After a 40-day fast it's time to consider force feeding before its too late. A medium size rat (100 g or 3.52 oz) should be soaked in egg yolk and very

The reproduction of the Atlantic bushmaster for the first time in captivity: we credit the good success ratio to the cool (75 °F average) temperatures of the incubator, the Atlantic rainforest (see Souza, 2007a).

cautiously placed in the mouth of the snake for venom injection and then slightly forced down the throat. Be sure to keep the forceps out of the way of the fangs so as not to break them. Be sure also to have two or three helpers for the procedure, ready to avoid the "neck twist" that will be attempted for sure. The procedure (force feeding) will give you time to try to figure out what the problem (refusing to eat) is: Oversized prey items? Heavy parasitism: *Strongyloides*, coccidia, *Ascaris*, *Trichomonas*, cestodes, pentastomids? Maladaptation syndrome (stress + parasites)? Exposure to wrong temperatures? A second reason for force feeding is to utilize the feed animal as a vehicle for routine deparasitization every six months. The medications are placed inside the food animal and provided to the snake utilizing the method mentioned above. The infested snakes in the highly successful *Lachesis* program of the Dallas Zoo were treated with mebendazole 20-25 mg/kg, metronidazole 200 mg/kg, ivermectin 200 μg/kg and niclosamide 150 mg/kg (Boyer et al., 1989). Their results settle the gossip that blames reproductive failures on ivermectin.

Necessity frequently leads to creativity, and Serra Grande has crafted low tech and very cheap tools (Souza, 2006), for their own specific needs and beliefs concerning bushmasters, and a good example of such tools is the "Duchamp" or "Bushamp," to safely probe or medicate large bushmasters (or any other "high-striker") without assistance and without restraining the neck region. Tubes are also part of the arsenal in Serra Grande, but again not to take any chances, the neck region has radically been avoided over there, with the exception of those two situations: force feeding for nutrition, and force feeding for routine deparasitization.

The surrealist masterpiece *Bicycle Wheel* of Marcel Duchamp (check below) was the inspiration to develop this simple device. Over the years Rod reports to have ended up doing a lot of solo (a huge mistake) procedures such as probing, tick removal, minor wound medication, etc., in 7-ft-plus individuals facing the eventual hazards of a free neck region, but the "Duchamp" (or "Bushamp") proved itself efficient and safe for the very experienced handler, and virtually harmless for the snake. Remember, this is necessary in Serra Grande. Back in the U.S. we typically use various tubes for proper restraint but the methods utilized by Rod might provide some new techniques for mild restraints during examination that keeps stress at a minimum on the snake. The WDC is going to experiment with the Duchamp method.

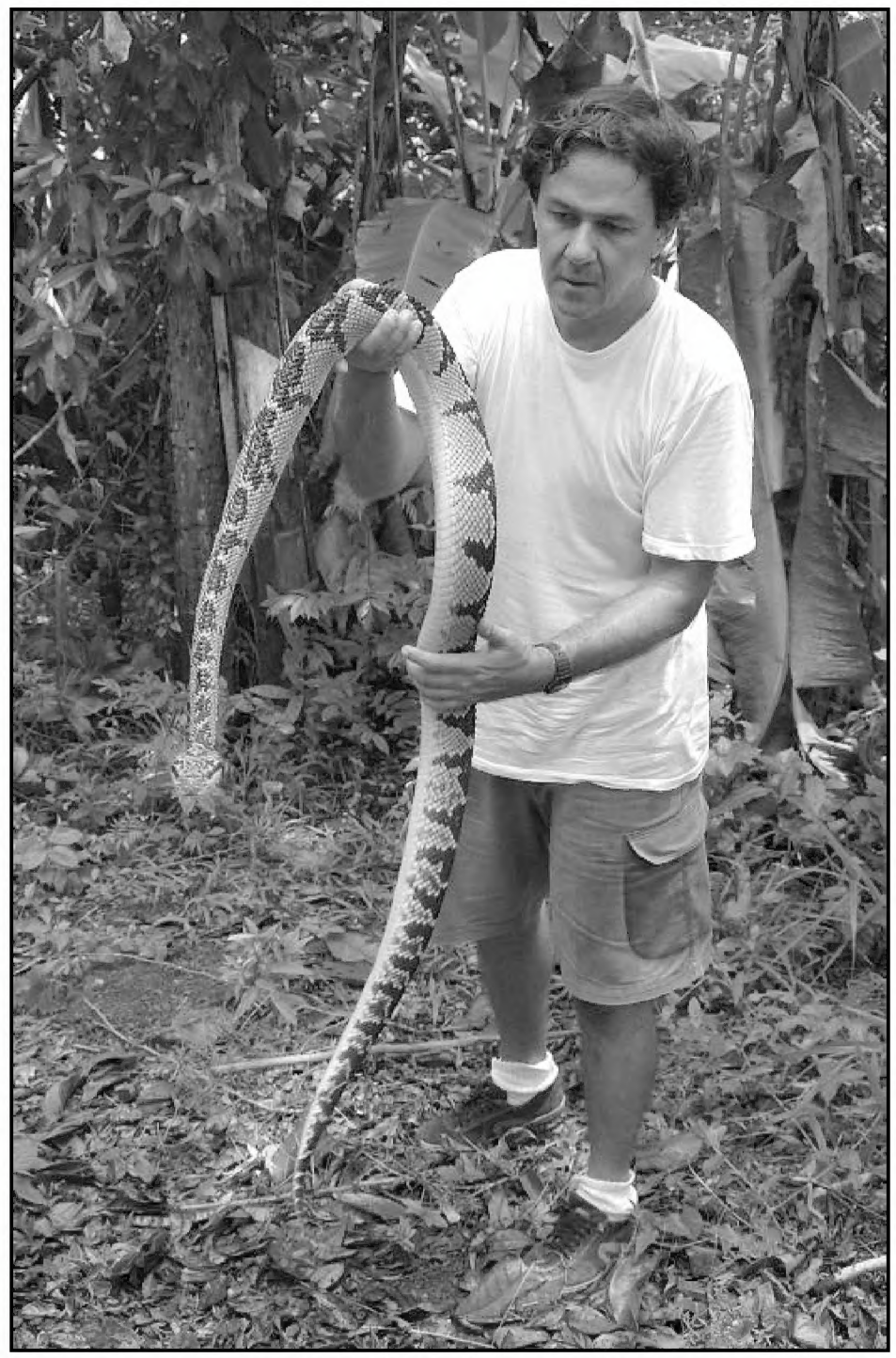


The Duchamp (1913) and the "Bushamp" (2007).

The images speak for themselves: remove the wheel from the Duchamp (1913) and add a heavy (80 pounds) concrete bottom to it and you'll have the "Bushamp" (2007).

The width between the steel bars is calculated according to the animals you deal with; 5 inches will be just fine in most cases. The height of the steel bars is also important (from 3 to 4 ft) so as to avoid a sudden release. Control the forward motion of the animal by gently holding/letting go the grip on the tail, and also move yourself around the device so as to keep the medium third of the animal tangled, avoiding a strike and backwards motion. In this specific case (photo) Rod is probing alone a 7-ft male, a 30-second procedure.

Still out of necessity, again to avoid neck injury and the terrible "shock state," where just by being treated roughly, but with no anatomic damage, the snake simply dies in front of your eyes, some bushmaster keepers have over the years attempted to improve the condemned practice of free handling. If one feels the need to use the method and is experienced enough to deal with it, just keep in mind that if you happen see the two loreal pits at once while free handling the animal, you're already a target. And one should also be aware that suddenly dropping the animal, even from a height as low as two feet, may be fatal to it, because of rupture of internal tissues and internal bleeding.



Free handling golden rule (obvious): if you see both loreal pits, you're already a target.

Staying alive

All those dealing with dangerous wildlife must remember that in nature there are individual differences and circumstances. One must never believe that "the genus" behaves in such and such a way: one individual may all of a sudden act differently. Overconfidence is what may really kill us, and we all better watch out full time for our own egos, as much as we do for concentration, distance and anticipation. One should be mostly concerned with space in the working area, for a fair chase or even a sequence of very high strikes are true possibilities: don't corner or allow yourself to be cornered by adult bushmasters.

One of the greatest pieces of advice we could get came from Pearn et al. (1994): "The 28 herpetologists interviewed had sustained 119 bites by potentially dangerous species, and hundreds of clinically insignificant bites. The experienced herpetologists sustained a life-threatening bite every 10 years (median). Herpetologists working with highly venomous snakes are at high risk. Prevention involves recognizing the risk; possessing a first-aid certificate; applying standard first-aid if a bite is sustained; carrying a mobile telephone; and not working alone." © 1994. *The Medical Journal of Australia*—reproduced with permission.

Shortly stated, if you are dealing with *Lachesis* your main concern should be your own safety since they come well equipped to kill you in one hour or less after a bite, and may completely knock you out in 10–20 minutes, even with very low volume of poison injected in your body. We do not advise any delay on your way to a nearby hospital, previously selected and whose staff (previously contacted preferably) is ready for such an emergency. Take as a rule: if the bite site is really painful and bleeding, chances are you've got "a bad one" and will quickly need antivenin.

For a full account of what to expect after a *Lachesis* bite, see Souza et al. (2007). In this article one may also realize the importance of the biochemical properties of *Lachesis* poison to the pharmacological world.

For an account in which quick antivenin was not available, one may refer to Mellor and Arvin (1996), who describe a previously healthy adult male, bitten right above the knee, striving for survival throughout three months of agony and pain, facing surgeries, infection and the amputation of one entire leg at pelvic level. An airlift and a five-day hospitalization may cost you over $150,000 in the U.S. Health insurance plans are a must for herpetologists.

Conclusion

We have mentioned already that 93% of the original Atlantic rainforest is gone. In the southern part of Bahia state, satellite photographs of a federal agency for cocoa research (CEPLAC) reveal that the remaining 7% of the forest is being devastated at a constant pace of 1% a year. That happens due to the so-called "little ant" deforestation: a small scale clear-cutting procedure, multi-focal and extremely hard to detect and prevent. Little by little all *Lachesis* territory turns into cattle territory, roads, villages, mega-resorts etc. And also, just by seeing a magnificent and apparently well preserved forest, you can't call it *Lachesis* territory: Huge expanses of the remaining rainforest (Maraú/Bahia area for instance), that provide the shade needed by the cocoa ("cacau") trees, have been heavily sprayed (mostly in the '80s) with the deadly and worldwide banned pesticide BHC (to "protect" cocoa and the chocolate industry) thus breaking the food chain in the forest, and so, the magnificent trees are all there, but not the rats, nor the snakes or lizards—nothing.

Without the forest, and so 1) without the humidity that will that will prevent eggs from dehydrating, and without the shade that will lower temperatures, and 2) facing a cultural association with the devil, fueling the ongoing slaughter, and 3) after major, criminal interferences in the food chain, what else can we expect for the future of the Atlantic bushmaster in the wild? Here also lies the importance for our captive breeding programs, maybe to "start it all over again" in the future, providing individuals for reintroduction in selected areas, and for other successful breeding programs.

As the three of us began our conversations on writing this article for CHS we struggled because there is so much we want to share, so much we still have to learn, and so much that we want the readers to know in terms of the plight of Brazil's Atlantic rainforest region and the need for aggressive conservation management plans to be in place not only to save the bushmaster but to save many species of wildlife. The habitat situation for the Central American species is not all that different. The Amazon forest still shelters and protects *Lachesis acrochorda* and *L. muta muta* (or *L. muta*). But how safe is the forest herself nowadays, and for how long? To save a species you must save its habitat and in order to save the habitat you must have a buy-in from those folks who live in that region. Pragmatic and idealistic issues are at the heart of saving this land and there must be a middle ground reached so that people can live and the bushmaster can continue to be an integral part of the natural heritage and biodiversity of this region. Working with *Lachesis* utilizing both primitive and modern day herpetocultural methods is an endeavor of love and probably the only method by which the true "Lords of the Rainforest" will be saved from a uncertain future in nature.

Again here the Tao of *Lachesis*, or the multiple ways to achieve a goal , without the limitations of "an expert's mind" where few possibilities exist, and where prejudice may reduce opportunities for learning.

As the sculptors of the "uncarved block," we must tell the story and bring awareness to the *Lachesis* plight. It would be a shame to think about a world without the largest pitviper known to humans. It's written on the tombstone of extinction: "Too few cared."

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What You Missed at the September CHS Meeting

John Archer
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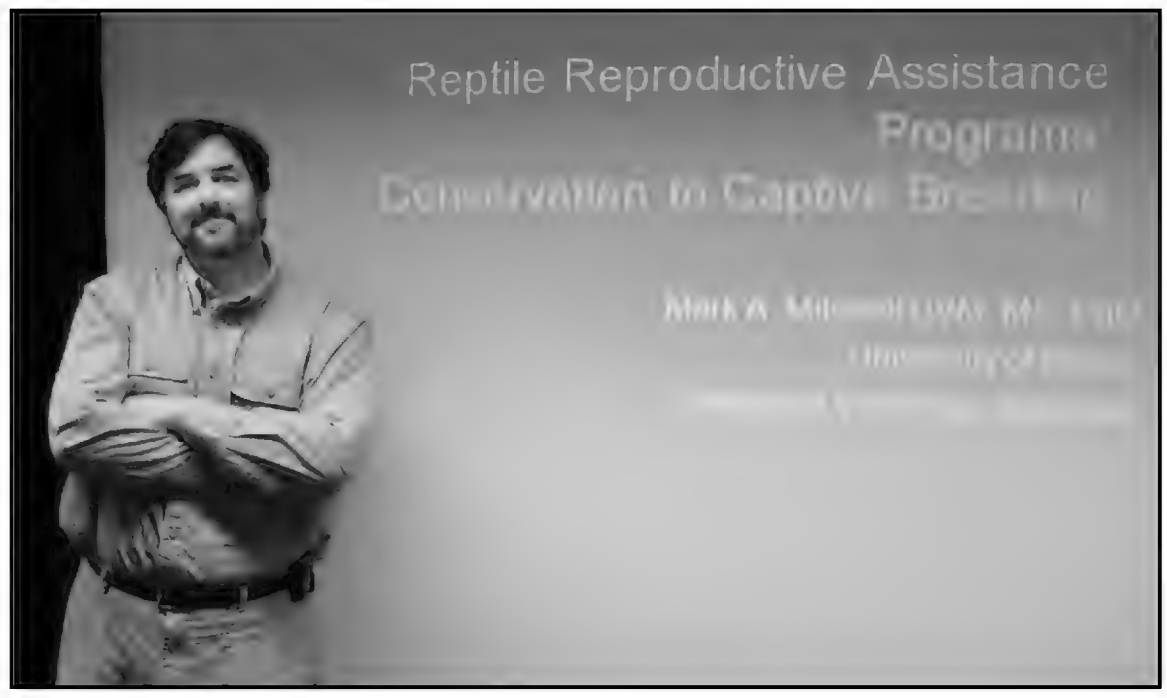
I've read somewhere that while all of us occasionally wonder why things are the way they are, scientists aren't satisfied with merely wondering, but seek the answers. Dr. Mark Mitchell is a scientist. He's also a DVM, MS, and PhD. He received his DVM in 1992 from the University of Illinois, his MS in clinical epidemiology from the U. of I. in 1997, and his PhD in clinical epidemiology with an emphasis on salmonella in reptiles at Louisiana State University in 2001. He's written over three hundred book chapters, peer-reviewed manuscripts, and scientific abstracts. He coauthored the *Journal of Exotic Pet Medicine* with Dr. Tom Tully, is past-president of the Association of Reptilian and Amphibian Veterinarians and currently scientific editor for that organization's *Journal of Herpetological Medicine and Surgery*, and is coeditor of the *Journal of Exotic Pet Medicine*. From 1996 to 2007 he was a member of the zoological medicine faculty at L.S.U. In 2007 he moved back to Illinois and is currently associate professor of zoological medicine and surgery at the University of Illinois. He has studied whale sharks and black bears, marine iguanas in the Galapagos and toxoplasmosis in feral cats. There are many topics he could have talked about, but the title of this talk was *Reptile Reproductive Assistance Programs: Conservation to Captive Breeding*.

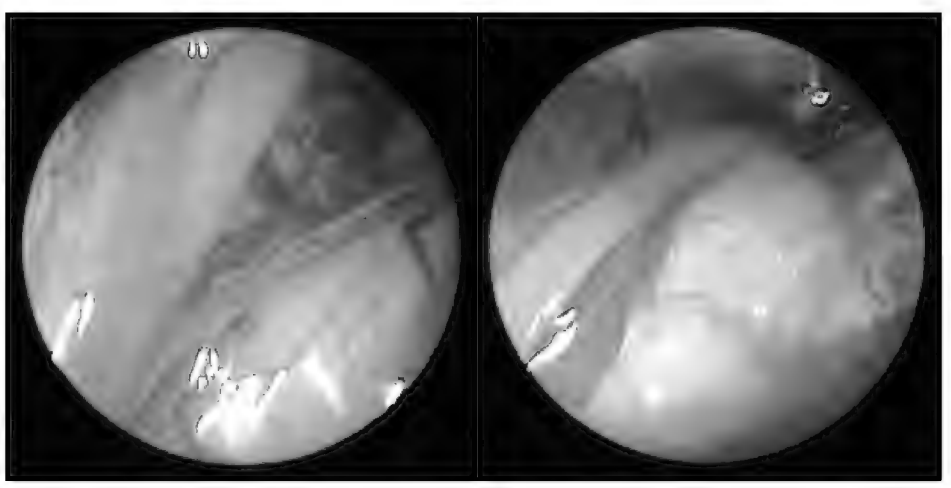


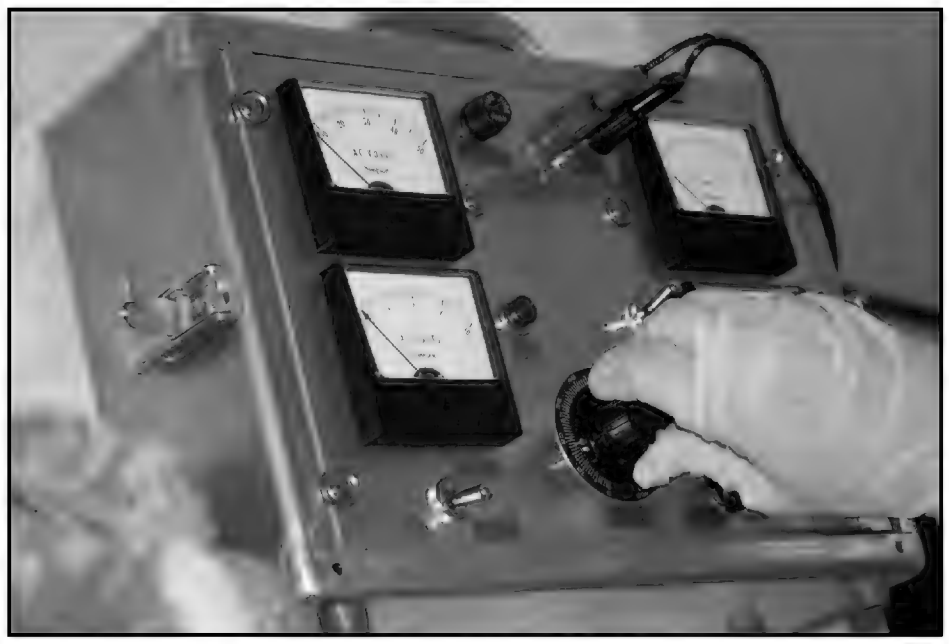
Photograph by Dick Buchholz.

I liked him immediately. I know that you're getting tired of my liking every speaker we have, but as I've said before, the speakers we have are carefully chosen, so I wouldn't expect to have a guest I didn't like. First of all Dr. Mitchell insisted that I call him Mark. Next he talked about his second child, a boy adopted from China only one month before. His oldest is a girl also adopted from China in 2006. He even showed me pictures. I've always liked people who are enthusiastic about their kids. He helped me set up the projector. (Does anyone see a trend here? If you can help and get to the meeting a little early, you would spare me the embarrassment of being exposed as totally incompetent with the media aids.) And he was a member of the CHS in his early days. He explains that from early on he wanted to be either a priest or a vet, but when he turned thirteen and discovered girls, vet became the only option.

He's also an accomplished speaker and keen listener, rapidly adapting his talk to the audience and bringing many things into his talk that he'd overheard during the start of the meeting. Reproductive assistance has been heavily studied for the cute and the commercially valuable. Much is known about domestic cattle, and pandas are continually studied. For animals as charismatic as raptors and as expensive as koi, research is ongoing and fairly well funded, but reptiles have been overlooked. Dr. Mitchell intends to remedy that. He feels that reptiles such as Blanding's turtles (*Emydoidea blandingii*) and Louisiana pine snakes (*Pituophis ruthveni*), most crocodilians and some marine and land iguanas are on the brink of extinction and reproductive studies may help save these animals. His latest work involves sex determination, particularly in young animals, identifying times for fertilization, methods for collecting reproductive samples and storing them, and developing methods to inseminate and monitor females.

Sex determination is usually most difficult in young animals. Incubation temperatures in many crocodilians and chelonians can determine sex, but not all species have been studied to determine how temperatures affect the sex. Mark is currently doing research with Dan Thompson of Willowbrook Wildlife Center in DuPage County using endoscopy on turtles only two years old to determine sex. Pictures shot through the endosope showed both male and female sex organs, a view inside that I always find interesting. So far the results have confirmed that temperature is a reasonably reliable predictor of sex in Blanding's, thus allowing head start programs to raise the correct ratio of male to female for release. As an aside, Dr. Mitchell mentioned that turtles exposed to UVB light have higher levels of vitamin D, comparable to those in the wild. Corn snakes also show elevated levels when exposed to UVB, something that will probably change my method of keeping snakes. Sexual dimorphism is probably the easiest method of determining sex when it's feasible. Genetic sexing is more difficult than most people think and because of the extensive work involved is not a choice for many reptiles.


Endoscopic views of the gonads of young Blanding's turtles: testis on left, ovary on right.



The electro-ejaculation controller. It looks like it would hurt!

The probe used for electro-ejaculation is a bit larger than the probes used to determine sex.

Dr. Mitchell next spent time talking about collecting and storing semen from snakes. Low quantities (.01 ml or about one drop was common) made collection and study more difficult, but Mark was able to determine that cryopreservation is not feasible at this time, that proper refrigeration can keep sperm sufficiently motile for about two days, and the amount, concentration, and motility did not rely on the age of the snake. In order to demonstrate the methods of sperm extraction from snakes, Mark waited until the end of his talk and the kids had left before playing what he labeled a PG-13 film. The audience was laughing loudly as the short film, with appropriate soundtrack, poked fun at the "erotic" aspects of semen capture in snakes.

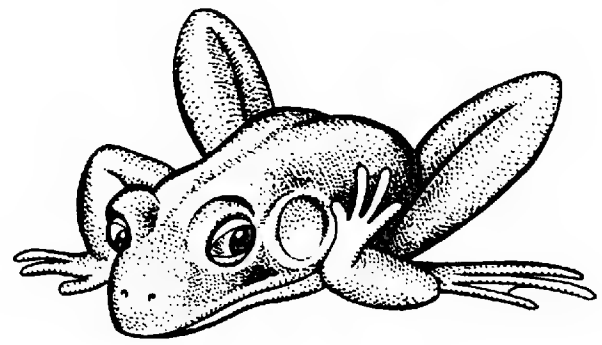
Lizards and turtles do not succumb to the stroking method used on snakes to collect samples, so his study had to rely on electro-ejaculation. After a picture showing the machine that controlled the current, and an explanation of the process that involves the insertion of a probe into the cloaca, I agreed with Mark's decision that anesthetizing the animal was the humane way to accomplish this procedure. Mark said that cattle breeders who perform this on bulls have told him that the bull doesn't mind, but he says that the bulls he's done it to seem to mind! While he performed this on many green iguanas (*Iguana iguana*), Dr. Mitchell obtained no semen, probably because he was not trying during the breeding season. He collected samples from tortoises, but found that the semen was useless (low motility) after 24 hours and that contamination of the samples could be a problem, though the quantities collected were much greater.

Of course, the last step is to inseminate a female with the collected sperm. While deposition is fairly straightforward using an endoscope, the timing is more difficult. Studies have found that ultrasound works well by allowing the female's follicles to be monitored and when those reach the correct size, insemination is usually successful.

What I can't convey in my summary is Dr. Mitchell's enthusiasm and curiosity. Hardly five minutes would pass in his talk without his mentioning another path his research may take, or another area where more research is needed. He half-jokingly (maybe one-quarter) says that one of his goals with this research is to eventually go to Indonesia and collect semen from wild Komodo dragons. I hope he manages that, but he also made the point that this research might be vital to many species in danger of extinction, and that some of his studies may even help with human reproduction. I'm pretty sure that Dr. Mark Mitchell will be seeking answers for a long time.

The Tympanum

National Reptile Breeder's Expo raises $27,000 for an endangered crocodilian



Each year the Expo in Daytona, Florida, raises money for private sector reptile and amphibian conservation through a benefit auction. This year, despite a tropical storm hanging over Daytona, the auction was not only a success, but we had our largest audience to date. The auction room was packed.

Funds raised through this year's Expo auction will benefit the Indian gharial, one of the most critically endangered crocodilians in the world. This unique crocodilian, considered safe after a massive captive breeding and release campaign in the late '70s and '80s, has been found to have lost tremendous ground over the last 8 years. Today there are less than 200 breeding adults in the wild, scattered over 7 sanctuaries; and this last winter one of the largest sanctuaries, the National Chambal River Sanctuary, suffered a mysterious and devastating die-off of over 117 gharial. Almost 30% of that sanctuary's next breeding generation (adult females and subadult males) are now gone. The Expo funds are headed directly to gharial conservation programs in India, including headstart programs, habitat protection and continued investigations into the die-off at the National Chambal River Sanctuary.

The world-renowned Director of the Gharial Conservation Alliance (GCA), Rom Whitaker, was in attendance throughout the Expo and presented a talk on the plight of the gharial just prior to the auction. While he was extremely excited to see the crowds of fellow reptile enthusiasts that were in attendance at the auction, he was ecstatic over the evening's fundraising success. "Words cannot describe the gratitude I feel towards all who helped make this weekend such a promising one for gharial conservation," said Rom. "Many thanks to everyone who donated their precious time and resources in order to help us preserve and protect the dwindling number of them that remain. You can do a great deal with very little money in India; fortunately, now we can do a great deal many times over with the money raised here."

The total for the seven years we have been holding the benefit auctions now exceeds $121, 000. It's not just about how much money we raise, but how well it's spent. Private sector conservation efforts are much more careful with their spending than are government agencies, institutions, and large international organizations. Funds are not to be used for travel, overhead and other expenses that do not directly benefit the species. In four of the years auction money has gone directly to important conservation projects in developing nations where US dollars go much further than they do in this country.

We hope to be able to have the 2009 auction benefit some species of amphibian since the previous seven auctions have all been for reptiles.

We thank Wayne Hill for sponsoring the auction, *Reptiles* Magazine and Herpster.com for sponsoring our pre-auction social, and all who helped, donated auction items, and participated. **Dave Lee, Benefit Coordinator (torresinc@aol.com), The Tortoise Reserve**

Unofficial Minutes of the CHS Board Meeting, September 12, 2008

The meeting was called to order at 7:40 P.M. at the Schaumburg Public Library. Board members Mike Dloogatch, Nancy Kloskowski and Matt O'Connor were absent.

Officers' Reports

Recording Secretary: Cindy Rampacek read the minutes of the August 8 board meeting. Minor corrections were made and the minutes were accepted.

Treasurer: Andy Malawy presented the August financial reports and no questions were raised.

Vice-president: Dave Barker will tentatively be the speaker at the April 2009 CHS meeting.

Sergeant-at-arms: The attendance at the August general meeting was 46.

Committee Reports

Shows:
• Chicagoland Family Pet Expo, Arlington Racetrack, March 20–22.
• Notebaert Nature Museum, first weekend of each month.
• Chicago Cultural Center, needs frogs (and volunteers) on October 15.
• Emily Oaks. They are looking for a reptile display this winter with our organization. They are flexible with working with us. They would like a date confirmation by October.
• NARBC is scheduled for October 11–12.
• Milwaukee Public Museum, Snake Day, November 15.
• Great Lakes Pet Expo, Saturday, January 31.

Library - Steve recently bought a few new books—*The Man Who Saved Sea Turtles: Archie Carr and the Origins of Conservation*; *The Snake Charmer: A Life in the Pursuit of Knowledge*; *Stalking the Plumed Serpent and Other Adventures in Herpetology*.

Adoptions: An unusual variety of animals has been through the rescue. Linda needed some advice with a veiled chameleon with health issues.

Old Business

Symposium 2009: We are awaiting a call back from Georgio's. Most requested speakers have asked for a check back after the first of the year due to possible scheduling conflicts.

Rules for Live Animal Exhibitors: A lively debate and discussion occurred. While all feel the guidelines are needed, there was a mild debate to address how detailed we will get. Suggestions were made for general changes and board members should expect frequent updates.

December General Meeting: The date for the December 2008 General Meeting is Tuesday, December 30.

New Business

NOAH: Dan made a motion to keep up exchange with NOAH while they transfer to all digital and the motion passed with 6 yes and 1 no vote.

Eric Tobin from the Michigan Society of Herpetologists will be trying to make the September meeting to discuss the MSH Midwest Herp Symposium.

Nominating Committee: Steve Sullivan is chair of the nominating committee. Rounding out the committee are Deb Krohn, Aaran LaForge, Rick Hoppenrath and Rich Crowley.

Round Table

.Linda suggested advertising in Amtrak's calendar of things to do in Chicago.

An Australian frog, thought to be extinct, has been rediscovered.

Dan will be sending lots of emails regarding updates on guidelines.

Deb may need boarding when she moves. Home sales apparently are hard when owning reptiles.

Aaron suggested Phil Tremper as a speaker or symposium guest. And his wife is gravid and due March 17.

Jason would like tables in a circle for future meetings.

The meeting adjourned at 9:30 P.M.

Respectfully submitted by recording secretary Cindy Rampacek

Herpetology 2008

In this column the editorial staff presents short abstracts of herpetological articles we have found of interest. This is not an attempt to summarize all of the research papers being published; it is an attempt to increase the reader's awareness of what herpetologists have been doing and publishing. The editor assumes full responsibility for any errors or misleading statements.

SEX IDENTIFICATION IN SLIDER TURTLES

A. M Readel et al. [2008, Copeia 2008(3):643-647] note that accurate classification of sex is essential for life history studies. Benchmark sizes that can represent the size of either the smallest, average, or upper size limit of males in a population exhibiting secondary sexual characters (SSCs) are often used to assign sex in emydid turtles. This method may be problematic, however, as it ignores variation in SSC development and is unable to identify the sex of smaller individuals. To address these two issues, the authors present a method using slider turtle (*Trachemys scripta*) standardized residual scores of third foreclaw length and preanal tail length versus plastron length. The use of benchmark sizes that reflected the smallest or average size of male maturity for the study population did not compromise accurate sex identification. Additionally, this method was able to accurately sex turtles that were smaller than the benchmark size. This method has the potential to enhance demographic studies on turtles by allowing researchers to identify juvenile sex ratios.

CRYPSIS AND IMMOBILITY

W. E. Cooper, Jr., et al. [2008, Copeia 2008(3):527-532] note that prey that are cryptic when at rest should limit movement to avoid disrupting crypsis. They studied effectiveness of crypsis and degree of reliance on immobility versus escape by *Craugastor* frogs approached by a predator. They studied detectability of *C. fitzingeri* resting in a 2 m diameter circle of leaf litter using four human observers. Nearly 40% of frogs were not detected within 60 s, and mean detection time was more than 30 s despite a small search area. Given a much lower density in natural habitats, it is likely that these frogs are rarely detected visually without area-concentrated search, except perhaps by predators sensitive to wavelengths not detected by human beings. When approached by a human, over 90% of individuals belonging to five species of *Craugastor* remained immobile until the predator reached them. Only *C. noblei* fled, and this species fled more frequently than the others at higher approach speed. Approach speed did not affect probability of jumping or distance jumped. Distance jumped varied among species, but was unrelated to body length except for *C. mimus* during fast approaches. Extreme reliance on crypsis reinforced by immobility suggests that crypsis is so effective in these frogs that survivorship may be higher for individuals that do not attempt to escape. The increased probability of being detected and attacked upon moving combined with limited escape capacity presumably raises the probability of being captured for frogs that jump. The importance of crypsis is emphasized by observations that almost all frogs that jumped reestablished crypsis after a single jump by becoming immobile, and some burrowed into leaf litter upon landing, concealing the head and part of the body.

METABOLIC COSTS OF PREGNANCY

T. J. Schultz et al. [2008, Copeia 2008(3):637-642] note that during pregnancy, the metabolic rate of females may increase above basal levels to support metabolically active tissues and developing embryos. In mammals, this energetic cost of supporting the pregnancy (MCP) is an important component of reproductive effort, but less is known about the magnitude of this cost in ectothermic vertebrates. The authors estimated the metabolic cost of supporting pregnancy in a tropical viviparous snake, the northern death adder, *Acanthophis praelongus*. They measured the metabolic rates of nongravid and gravid females throughout gestation and following parturition. They also measured the oxygen consumption of a sample of neonates from each clutch within 24 h of birth. The metabolic rate of gravid females rose slowly during pregnancy, but was significantly elevated during the last three weeks of gestation. Considering the late term metabolism of gravid females as 100%, then the baseline metabolism of female death adders represented 36.6%, embryo metabolism accounted for 37.0%, and the cost of supporting the pregnancy was 26.4% of the total metabolic rate. Neonate metabolism during the first 24 h of birth was 2.9 times higher than the estimate for embryo metabolism. Thus, these results do not support the assumption that the metabolism of embryos (prior to birth) and neonates is similar in this species. Although gravid female death adders maintain high and constant body temperatures during late gestation, the energetic cost of supporting the pregnancy is only a minor component of the total reproductive effort for females of this species.

ECOLOGY OF AN ARGENTINEAN SNAKE

M. S. López and A. R. Giraudo [2008, J. Herpetology 42(3):474-480] studied the sexual dimorphism, feeding habits, reproductive biology, and seasonal activity of the snake *Philodryas patagoniensis* in northeastern Argentina, where this species is the most abundant snake. There were differences in snout–vent length, tail length, and scale counts between adult males and females. Juveniles showed significant sexual dimorphism in tail length and scale counts. A total of 92 prey items was recorded from 184 specimens, with reptiles being the most common prey (58%) and *Cercosaura schreibersii* the most frequent individual prey item (26%). However, amphibians (15%), mammals (10%), and birds (4%) were taken occasionally. Evidence was found of an ontogenetic diet shift because adults included endothermic prey. The female reproductive cycle was seasonal, and clutch size was positively correlated with female SVL. *Philodryas patagoniensis* was active throughout the year but significantly less so in winter and more so in spring. The great abundance of *P. patagoniensis* in South America may be influenced by its foraging and reproductive plasticity, feeding frequency, and the prey availability and abundance. Therefore, the authors suggest that this species may be an important predator in South American ecosystems.

Advertisements

For sale: rats and mice—pinkies, fuzzies and adults. Quantity discounts. Please send a SASE for pricelist or call Bill Brant, *THE GOURMET RODENT*, 6115 SW 137th Avenue, Archer FL 32618, (352) 495-9024, E-mail: GrmtRodent@aol.com.

For sale: from **The Mouse Factory**, producing superior quality, frozen feeder mice and rats. We feed our colony a nutrtionally balanced diet of rodent chow, formulated especially for us, and four types of natural whole grains and seeds. Mice starting from: pinks, $.17 each; fuzzies, $.24 each; hoppers, $.30 each; weanling, $.42; adult, $.48. Rats: starting with pinks at $.45 each, to XL at $1.80 each. Discount prices available. We accept Visa, MC, Discover or money orders. PO Box 85, Alpine TX 79831. Call **toll-free** at (800) 720-0076 or visit our website: <http://www.themousefactory.com>.

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For sale: Graptemys.com T-shirts, 100% cotton, pre-shrunk, pigment-dyed shirts with the Graptemys.com embroidered logo. These are very high quality shirts with that stylish faded look. Sizes S-M-L-XL-XXL. Colors: Pacific blue, nautical red, brick red, plum, granite, khaki green and putty. All profits made from these shirts goes directly to in situ *Graptemys* research. $20 each with $3.00 shipping. Email: chris@graptemys.com or call (239) 437-4148 to order. You can look at the shirts at http://www.graptemys.com/shirts.htm

For sale: books. *Birds of Colorado* by Bailey and Niedrach, 1965, 2 large volumes, 895 pages total, 124 color plates (paintings) by noted artists, plus many b&w photos; this is the reference for Colorado birds, dust jackets tattered at top and bottom, otherwise excellent condition, $83; *Distribution of Mammals in Colorado* by David Armstrong, 1972, 415 pp., range maps, tables, some b&w photos of habitats, $32; *Australia's Reptiles—A Photographic Reference to the Terrestrial Reptiles of Australia* by Stephen K. Wilson and David G. Knowles, 1988, 447 large (8" × 11½ ") pp., 847 color photos, drawings, range maps, descriptions, taxonomy, habitats, habits, extensive bibliography, text based on field work by authors throughout Australia, DJ, $130; *Australian Snakes, Crocodiles, Tortoises, Lizards* by Eric Worrell, 1967 (1966), 64 pp., many b&w and color photos, photo of Worrell milking a taipan on page 52, $22. All books hardbound and in excellent condition except as noted. $3 postage and handling for orders $25 and under, free for orders over $25. E-mail for complete list. Books make good Christmas presents. William R. Turner, 7395 S. Downing Circle W., Centennial, CO 80122; telephone (303) 795-5128; e-mail: toursbyturner@aol.com

For sale: Well started 2008 C.H. Sri Lankan stars, leopard tortoises and pancake tortoises. All captive-hatched by us and eating great. Stars are $450 each, with temperature-sexed pairs from unrelated females available. Leopards are $125 each and pancakes are $350. Contact Jim or Kirsten Kranz at 262-654-6303 or e-mail KKranz1@wi.rr.com.

For sale: Trophy quality jungle carpet, diamond-jungle, and jaguar carpet pythons. Website: moreliapython.googlepages.com E-mail: junglejohn@tds.net

For sale: Well started spider morph ball pythons (*Python regius*) available for free delivery in the Chicagoland area—males, $350. Also available are high-contrast, Sarawak locality and Walnut × Sarawak pairing Borneo pythons (*Python breitensteini*). Pricing is based on male sex with $50 more for females, if available: 2007 high-contrast, $150; 2007 Sarawak, $175; 2006 Sarawak,$200, 2007 Walnut × Sarawak (melanistic Borneos), $125. All feeding on frozen thawed adult mice and/or rats. Shipping available as an additional cost, if needed. Details and helpful info on my website at www.richcrowleyreptiles.com Contact Rich Crowley at 708-646-4058 or email pogona31@yahoo.com.

Herp tours: **Madagascar—Tortoise Tour** & **Chameleon Tour** seeking adventurous members for January–February 2009. The goal of the tortoise tour, to be co-led by **Peter Pritchard** of the Chelonian Research Institute and **Bill Love**, will be to see all native species in the wild and record various aspects of their lives photographically. The later chameleon tour, co-led by **Mike Monge** of FL Chams and **Bill Love**, will focus on panther chameleons, trying to find and photograph as many of the color morphs as possible in the wild. Details are at Blue Chameleon Ventures' site at: www.bluechameleon.org.

Herp tours: The beautiful Amazon! Costa Rica from the Atlantic to the Pacific! Esquinas Rainforest Lodge, the Osa Peninsula, Santa Rosa National Park, and a host of other great places to find herps and relax. Remember, you get what you pay for, so go with the best! GreenTracks, Inc. offers the finest from wildlife tours to adventure travel, led by internationally acclaimed herpers and naturalists. Visit our website <http://www.greentracks.com> or call (800) 892-1035, E-mail: info@greentracks.com

Snake sitting or boarding: Mild-mannered adult female reticulated python, 18 feet, needs you from May to fall 2009. We are searching a responsible person either to housesit with her in northern Michigan or care for her at your home (non-Illinois only). Must be willing to feed her rabbits and shed her. Attractive, flexible terms. For more details, contact Kathy Bricker, 231-627-4830 or kathyhomeaccount@hotmail.com

Line ads in this publication are run free for CHS members—$2 per line for nonmembers. Any ad may be refused at the discretion of the Editor. Submit ads to: Michael Dloogatch, 6048 N. Lawndale Avenue, Chicago IL 60659, (773) 588-0728 evening telephone, (312) 782-2868 fax, E-mail: MADadder0@aol.com

ReptileFest 2009

April 4–5

It's creeping up on you

News and Announcements

2009 CHS HERPETOLOGICAL GRANTS PROGRAM

The mission of the Chicago Herpetological Society is education, conservation and the advancement of herpetology. To further this mission, the CHS provides grants of up to $1,000 in the following categories:

1. Illinois Herpetology
2. Graduate Student Research in Herpetology
3. Undergraduate Research in Herpetology
4. Conservation
5. Captive Management, Husbandry and Propagation

The number of grants awarded in each category will depend on the grant applications received; it is possible that not all categories will receive awards and some categories may receive more than one award. The Grants Committee reserves the right to reassign the category under which a given proposal is submitted.

To qualify for a grant, the applicant must be a member of the Chicago Herpetological Society as of December 31, 2008. In accepting a grant, the recipient agrees to acknowledge the Chicago Herpetological Society in any publications or public presentations of research funded by this grant. Further, the recipient agrees to abide by all state and federal laws.

Recipients must submit a short report of their research findings to the CHS within 6 months of their anticipated completion date. The report should be written for a general audience and be suitable for publication in the CHS *Bulletin* or on the CHS webpage. This requirement may be waived if results will be published in a peer-reviewed journal within a year. Recipients may be invited to present a program at a CHS general meeting.

Applications must include the following:

1. Project title
2. Applicant's name, address, phone and email
3. Submission category
4. Introduction—Provide background for the proposed work. Include a clear statement of the objectives of the proposed work.
5. Materials and methods—Describe the study site and the materials and methods (in non-technical terms) that will be used to accomplish the objectives of the proposed research. Attach plans, diagrams and maps as necessary. Indicate whether you have an approved Animal Care (IACUC) protocol covering the proposed methods or whether you will be submitting such a protocol.
6. Applicability and broader implications—How does this work apply to conservation, education and the advancement of herpetology?
7. Budget—Indicate the budget for the entire project and make clear what portion the CHS grant money would fund.
8. Anticipated completion date for the research
9. Applicant curriculum vitae
10. Letters of support — Student applicants must include a letter of support from a faculty advisor. For non-academic individual and institutional applicants, letters of support from collaborating partners or institutions are strongly encouraged. Letter(s) of support may be emailed and should include an address and phone number at which the writer can be contacted. Letter(s) of support may also be sent by postal mail.

Proposals should be submitted as email attachments. Attachments should include the applicant's name in the file name. Proposal text should not exceed five double-spaced pages (excluding literature cited, applicant's CV, and letters of support) and should be typed using a common font (e.g., Arial, Times, Courier) no smaller than 10pt. Applications must be received by December 31, 2008, and awards will be announced by February 15, 2009.

Grants should be emailed to grants@chicagoherp.org

Questions should be directed to Mike Dloogatch (773) 588-0728, or grants@chicagoherp.org

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17. Signature of Editor Michael Dloogatch

UPCOMING MEETINGS

The next meeting of the Chicago Herpetological Society will be held at 7:30 P.M., Wednesday, October 29, at the Peggy Notebaert Nature Museum, Cannon Drive and Fullerton Parkway, in Chicago. **Will Bird** and **Phil Peak** will be discussing their new book on field herping techniques. These Kentucky natives, two of the hardest working field herpers around, have made contributions to the knowledge base of their local herps by contributing their field notes, voucher specimens (when needed), and their blood and sweat. Their hard work has paid off in the form of record-size animals for both their state and the country, as well as the first pine snake found in western Kentucky in decades, which they hope will lead to more conservation efforts by the state in that region. The talk will include many neat slides and their enthusiasm which is contagious. They will share some secret tips into their success in the field.

The November 28 meeting will include the annual election of officers and members-at-large of the CHS Board of Directors.

The regular monthly meetings of the Chicago Herpetological Society take place at Chicago's newest museum — the **Peggy Notebaert Nature Museum**. This beautiful new building is at Fullerton Parkway and Cannon Drive, directly across Fullerton from the Lincoln Park Zoo. Meetings are held the last Wednesday of each month, from 7:30 P.M. through 9:30 P.M. Parking is free on Cannon Drive. A plethora of CTA buses stop nearby.

Board of Directors Meeting

Are you interested in how the decisions are made that determine how the Chicago Herpetological Society runs? And would you like to have input into those decisions? If so, mark your calendar for the next board meeting, to be held at 7:30 P.M., November 14, in the adult meeting room on the second floor of the Schaumburg Township District Library, 130 S. Roselle Road, Schaumburg.

The Chicago Turtle Club

The monthly meetings of the Chicago Turtle Club are informal; questions, children and animals are welcome. Meetings normally take place at the North Park Village Nature Center, 5801 N. Pulaski, in Chicago. Parking is free. For more info visit the CTC website: http://www.geocities.com/~chicagoturtle.

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